

REMARKS/ARGUMENTS

Claims 1, 2 and 4-11 have been rejected under 35 U.S.C. § 103 as obvious over Bommart in view of Song. Claim 3 has been rejected under 35 U.S.C. § 103 as obvious over Bommart and Song in view of Hargrave et al.

Independent claim 1 has been amended to more clearly distinguish from the cited art.

The present invention relates to a cover for closing a top opening of a thermite reaction chamber of a crucible.

A thermite reaction taking place in a crucible, although not explosive, can create short bursts of extremely high temperatures focused on a very small target for a short period of time, thereby making it suitable for welding applications. The crucible for containing the thermite reaction is generally heat resistant and preferably, although not necessarily, readily destructible, e.g., made of sand agglomerated by means of a hydrophobic resin.

A thermite reaction generally comprises the following steps:

- an aluminothermic charge, which is a pyrotechnic composition of aluminum powder and a metal oxide, is inserted in the crucible,
- the thermite reaction is initiated by igniting the aluminothermic charge,

the cover is placed on the crucible for closing the top of the reaction chamber,

- the thermite reaction leads to an intense exothermic reaction, which produces:

molten metal,
projected particles, and
gases and dust, constituting fumes.

The formation of gases increases the pressure inside the reaction chamber and thus tends to lift the cover.

The invention is a cover for a crucible in which the aforementioned thermite reaction can occur. Prior art covers are provided with vents for relieving the pressure inside the reaction chamber. Examples of such prior art covers are discussed in paragraphs 0002 - 0012 of the specification. Bommart, the primary reference cited against the application, is another example of a vented prior art cover.

Bommart discloses a cover for closing a top opening of a thermite reaction chamber of a crucible similar to that disclosed in EP 0 407 240 B1 which is discussed at paragraph 003 of the present specification as prior art. Bommart employs a filtering assembly for closing the top opening of the reaction chamber and filtering fumes, including a cover 85 and a filter cap 103.

Bommart teaches that the cover 85 which rests substantially continuously on the upper edge of the crucible should be sealed by means of a luting paste (col. 15, lines 62-67). That is, Bommart teaches away from securing a filter material to the bottom edge of the cover and using a cover of sufficient weight to withstand the pressure in the crucible chamber without the use of an adhesive between the cover and crucible.

Bommart's cover has a venting aperture 97 that allows the fumes and particles generated by the thermite reaction to leave the reaction chamber (see col. 16, lines 710), and is, thus, not "continuous" as taught and claimed by applicants.

The filtration of the fumes and the particles is accomplished by a filter cap 103 sealed on the cover (see col. 16, lines 12-15).

Claim 1 distinguishes from Bommart in reciting that the cover of the invention is substantially continuous, i.e., does not have any vent opening that would allow significant leakage of unfiltered fumes into the atmosphere (see paragraphs 0016 and 0018 of the specification). Claim 1 also recites that, unlike Bommart, an annular and substantially continuous filter lining is secured to the bottom edge of the crucible cover.

Moreover, as herein amended, claim 1 further recites:

the cover having a weight heavy enough to prevent dislodgement in response to the pressures developed during a thermite reaction, and light enough to enable the filter lining to allow gases developed in the thermite reaction to escape from the thermite reaction chamber while retaining dust and projected particles.

In rejecting claim 1 of the application, the Examiner has asserted that Song teaches the provision of a filter at the closure/support junction to allow for venting, and that it would be obvious to replace Bommart's venting aperture with Song's filter.

Song's plant culture vessel has a base 10 and a cap 11, both made of plastic (see col. 2, lines 4-19). An opening in the base 10 is defined by the tops 16 of the walls which surround the opening.

An L-shaped annular rim 17 is affixed to the outside of the walls below their tops 16 and surrounds the base. A length of filtering material 39 is pressed into a channel 21 within the annular rim 17 in order to allow the vessel to breathe, while preventing air-borne contamination from entering the vessel (see col. 3, lines 26-45). The filtering material is not secured to the cover as required by independent claim 1 of the instant application.

Walls 26 inside of the annular rim of the cap 11 extend downwardly into the channel 21 and engage the filter 39. The annular rim of the cap 11 does not engage or otherwise interact with the filter 39.

Claim 1 recites

A cover for closing a top opening . . . of a thermite reaction chamber of a crucible, the cover . . . including . . . a bottom peripheral edge suitable for bearing against a top peripheral edge defining said top opening. . . .

The bottom peripheral edge of Song's cover does not bear against the top peripheral edge 16 defining Song's top opening. Nor does the bottom of the channel 21, where Song's filter resides, define Song's top opening.

Claim 1 continues:

said cover being substantially continuous and said bottom edge having secured thereto a filter lining. . . .

There is no filter lining secured to the cover of Song's vessel. Instead "a length of filtering material would be inserted

into the space 21 and completely encircling the walls 14." (See Song at col. 3, lines 27-30).

Hence even if Bommart were modified in accordance with the teachings of Song, by closing the vent opening in the cover, affixing an annular rim to the outside wall of the crucible, and providing the cover with walls extending downwardly into a channel in the annular rim, applicants' claim 1 would not be readable on it.

The present invention provides a cover for a thermite reaction crucible which can filter fumes without requiring a filter cap, and which can withstand the pressure that develops inside the chamber during the thermite reaction. It is highly unlikely that one having ordinary skill in the art, e.g., an engineer specialized in thermite reactions, would look to Song's plastic plant culture vessel which is wholly unsuited to the temperature and pressure extremes reached in a thermite reaction.

Moreover, Song does not overcome Bommart's lack of a teaching to employ a cover

having a weight heavy enough to prevent dislodgement in response to the pressures developed during a thermite reaction, and light enough to enable the filter lining to allow gases developed in the thermite reaction to escape from the thermite reaction chamber while retaining dust and projected particles

In view of the above, applicant respectfully submits that independent claim 1 and its dependent claims 2-11 are patentable over Bommart in view of Song.

Hargraves et al. has been cited against claim 3 for teaching the use of filters containing synthetic fibers. Hargraves et al. discloses a packaging for fresh roasting coffee which includes a semi-rigid container 300 for roasted and ground coffee, preferably comprised of plastic. The top of the container is closed by a releasable closure member 200. A filter 400 is provided between the container and the closure member to prevent aspiration of the roasted and ground coffee from the container upon initial opening of the package (see col. 8, lines 15-30). The filter is made of woven or non-woven material using natural or synthetic fibers (see col. 11, lines 55-56).

The use of a filter of synthetic fibers in a package for ground coffee, would hardly render such a filter on a cover for a crucible obvious in view of the differences in their environments as described above.

For the foregoing reasons, reconsideration of the rejection of claim 3 in view of Hargraves et al. is also respectfully requested.

The prior art cited but not applied in the rejection is believed to be inapposite to the claims.

In view of the foregoing, it is respectfully submitted that the application is now in condition for allowance. Early and favorable action is earnestly solicited.

An unpaid fee required to keep this case alive may be charged
to deposit account 06-0735.

Respectfully Submitted,

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